# Electronic Foreclosures \$

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Introductio ●0000	'n	Empirical Strategy and Data	Results 0000000000	Conclusion
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# Introduction

- Asset illiquidity: demand frictions [trade costs, as.info] lead to poor matching and suffocate prices;
  - Restricted pool of bidders;
  - Best-suited buyer is unlikely to bid readily, especially in forced asset sales (Shleifer and Vishny, 1992);

Introduction	Empirical Strategy and Data	Results	Conclusion
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# Introduction

- Asset illiquidity: demand frictions [trade costs, as.info] lead to poor matching and suffocate prices;
  - Restricted pool of bidders;
  - Best-suited buyer is unlikely to bid readily, especially in forced asset sales (Shleifer and Vishny, 1992);
- Market segmentation, Underinvestment, and Resource Misallocation (Gurley and Shaw, 1960; Diamond, 1982; Allen and Santomero, 1997).
- Welfare losses of these frictions?
  - This paper: U.S. Real Estate (foreclosure) auctions;

Introduction o●ooo	Empirical Strategy and Data	Results 0000000000	Conclusion

## Foreclosure auctions

 Foreclosure sales: public auction of mortgaged property at the premises of county courthouse;



Introduction 00●00	Empirical Strategy and Data	Results 0000000000	Conclusion
Policy			

- Poor outcomes: typically no show, 80+% properties bought by lenders (REOs);
- Substantial holding costs (15-20% of market value) over a long time (up to 24 months);

Introduction	Empirical Strategy and Data	Results	Conclusion
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Policy			

- Poor outcomes: typically no show, 80+% properties bought by lenders (REOs);
- Substantial holding costs (15-20% of market value) over a long time (up to 24 months);
  - REOs create negative *physical* externalities on the value of neighboring properties (Harding et al., 2009; Lin et al., 2009; Campbell et al., 2011).
- This paper assesses effects of a technology;
  - Florida House Bill 773 (2008): Electronic bidding;
  - Staggered adoption (exogenous to poor foreclosure outcomes)  $\rightarrow$  DD design;

Introduction	Empirical Strategy and Data	Results	Conclusion
00000		0000000000	00
Preview of res	ults		

- Foreclosed properties sold faster: auction success increases by 27%;
  - and at better prices: auction discount decreases by 42%;
  - IV (courthouse backlog) confirms;

Introduction	Empirical Strategy and Data	Results	Conclusion
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Preview of res	ults		

- Foreclosed properties sold faster: auction success increases by 27%;
  - and at better prices: auction discount decreases by 42%;
  - IV (courthouse backlog) confirms;
- Benefits larger in months with more auctions, for properties in better shape, and in counties with remote courthouse;
- Auction Buyers:
  - $\bullet~+$  Local (Informed), Loyal, NonProfessional, SoloProp holder;
- REO market does not worsen. Ex-ante credit supply enhanced.
- Welfare gains substantial;



# • Electronic marketplaces: eliminate search costs (Bakos '97, '98);

- If sellers have market power, online products can be **cheaper** than offline (Brown and Goolsbee 2002, Morton et al. 2001);
- otherwise, the buyer-externality of the Internet **increases** prices (Bailey 1998, Lee 1998);

# • Costly liquidations:

- Foreclosures: Discount (Physical, Stigma, Buyer constraints)
  + Price Spillovers (Physical, Supply/Competition);
- **Barriers to trade**: Arbitrage improves price efficiency (Sharpe et al., 1999);
  - shortens price reactions to county- or city-specific shocks (Hallwood and MacDonald, 2000; Lafrance et al.,2002);

Introduction	Empirical Strategy and Data	Results	Conclusion
00000	•000	0000000000	00
Technology A	doption		

- 07/2008: FL counties can conduct electronic bidding auctions;
  - Lower hurdles for everyone to participate and bid;
    - More competition;
    - 2 Higher max reservation price;
    - $\bigcirc$   $\rightarrow$  Higher success rate and lower discounts.

Introduction	Empirical Strategy and Data	Results	Conclusion
00000	•000	0000000000	00

# Technology Adoption

- 07/2008: FL counties can conduct **electronic bidding** auctions;
  - Lower hurdles for everyone to participate and bid;
    - More competition;
    - 2 Higher max reservation price;
    - $\bigcirc \rightarrow$  Higher success rate and lower discounts.
- Operational inefficiencies of live auctions: paper-based processes, unforeseen events (blizzards, fire drills, power outages), political/personal disruptions → backlog.

Introduction	Empirical Strategy and Data	Results	Conclusion
00000	0●00	0000000000	00

## Treatment timing

- Treated: receives treatment + at least one control county;
- Control: never-treated (or not-yet-treated) + adjoining treated;
  - Matching with replacement;



Introduction	Empirical Strategy and Data	Results	Conclusion
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### Data

- Real Property Roll (2009-2019) from FL Department of Revenue;
  - Covering all real estate sales in Florida, including transfer type, price and date;
  - Property characteristics: exact location, size, age, quality, appraised value (counterfactual), etc.;
  - Owner name and residence;

Introduction 00000	Empirical Strategy and Data	Results 0000000000	Conclusion

## Data

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  - Property characteristics: exact location, size, age, quality, appraised value (counterfactual), etc.;
  - Owner name and residence;
- Electronic Auction data from *realauction.com*;
  - Non-winning bids unavailable (observable only for treated counties after shock);
    - Looking at (final) buyers, Courthouse accessibility, Property attractiveness;
- Monthly court legal filings (for IV) from Office of the State Courts Administrator;

Introduction	Empirical Strategy and Data	Results	Conclusion
00000		0000000000	00
Methodology			

• Auction-level Linear Probability Model (LPM):  $Outc_{i,c,t} = \beta Treat_c \times Post_t + \gamma Treat_c + X_{i,c,t} + FE_{bt,g} + \varepsilon_{i,c,t}$ (1)

- where foreclosed property *i* located in county *c* of border *b* auctioned in month *t*. Stats
- CountyBorder × time Fixed effects crucial;
  - When staggered rollout, negative weights in TWFE DD (Goodman-Bacon 2021)
    - "stacked diff-in-diff" (Cengiz et al., 2019)
  - Geography g can be either county, zip code or census tract.
- $\beta$ : captures the electronic bidding effect;

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Introduction	Empirical Strategy and Data	Results	Conclusion
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Introduction	Empirical Strategy and Data	Results	Conclusion
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Introduction	Empirical Strategy and Data	Results	Conclusion
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## Auction Success dynamics



22 10 / 22

Introduction	Empirical Strategy and Data	Results	Conclusion
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# Auction Success

Dep. var.: AucSucc <sub><math>i,c,t</math></sub>	(1)	(2)	(3)	(4)	(5)
$Treated_c \times Post_t$	.0542***	.0529***	.0456**	.0503***	.0493***
	(3.04)	(3.00)	(2.23)	(2.75)	(2.78)
Treated <sub>c</sub>	0469**	0530***			
	(-2.57)	(-3.25)			
$HouseAge_{i,c,t}$		00127***	00105***	000811***	000867***
		(-5.34)	(-4.67)	(-5.45)	(-6.17)
$ln(Size)_{i,c,t}$		0280***	0385***	0282***	0247***
		(-3.76)	(-7.79)	(-7.97)	(-8.02)
NoResUnts $_{i,c,t}$		00007***	.00097	.00005	00046
		(-9.12)	(.72)	(.06)	(54)
$StrucQual_{i,c,t}$		0115**	00693**	00058	00089
		(-2.13)	(-2.12)	(31)	(49)
$Border \times Month \; FE$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Geog FE	Х	Х	с	z	n
# of Observations	441,264	411,519	411,519	331,316	350,065
$R^2$	.046	.049	.063	.081	.092
adj. R <sup>2</sup>	.044	.047	.061	.075	.076

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Introduction	Empirical Strategy and Data	Results	Conclusion
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• Ec. sign: .0493/.<u>1809=27.3%</u>

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Introduction 00000	Empirical Strategy and Data	Results 0000000000	Conclusion

# Event Study - Auction Success



Introduction	Empirical Strategy and Data	Results	Conclusion
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# Auction Discount

Dep. var.: AucDisc $_{i,c,t}$	(1)	(2)	(3)	(4)	(5)
$\overline{Treated_c \times Post_t}$	0485***	0435***	0263**	0279*	0337**
	(-4.96)	(-5.06)	(-2.08)	(-1.77)	(-2.18)
Treated <sub>c</sub>	.0518***	.0385***			
	(3.02)	(2.68)			
$HouseAge_{i,c,t}$		.00205***	.00193***	.00192***	.00198***
		(12.66)	(13.98)	(10.40)	(11.46)
$ln(Size)_{i,c,t}$		0453***	0295***	0205***	00903*
		(-5.76)	(-5.90)	(-4.38)	(-1.91)
NoResUnts $_{i,c,t}$		.0609***	.0495***	.0399***	.0443***
		(4.56)	(4.45)	(3.86)	(3.89)
$StructQual_{i,c,t}$		.0188	00128	.00244	.00394
		(1.62)	(70)	(.78)	(1.64)
$Border \times Month \; FE$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Geog FE	Х	Х	с	z	n
# of Observations	60,562	58,929	58,928	50,346	51,449
$R^2$	.090	.132	.168	.221	.288
adj. R <sup>2</sup>	.080	.122	.157	.193	.225

Introduction	Empirical Strategy and Data	Results	Conclusion
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## Auction Discount

Dep. var.: AucDisc <sub>i.c.t</sub>	(1)	(2)	(3)	(4)	(5)
$Treated_c \times Post_t$	0485***	0435***	0263**	0279*	0337**
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• Ec. sign: -.0337/.0797=-42.3%

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Introduction	Empirical Strategy and Data	Results	Conclusion
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# Event Study - Auction Discount



Introduction 00000	Empirical Strategy and Data	Results ○○○○○●○○○○○	Conclusion 00
2SLS			
2SLS			

 Endogeneous take-up ← exploit court backlog to predict adoption (Duflo 2001);



- Adopters (triangles) more exposed than non-adopters (circles);
- similar pic with InNonFcl<sub>c,t∈(-12;0)</sub>

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Introduction 00000	Empirical Strategy and Data	Results ○○○○○○●○○○○	Conclusion
2SLS			
2SLS (I)			

Dep. var.:	AucS	ucc <sub>i,c,t</sub>	AucDisc <sub>i,c,t</sub>	
	(1)	(2)	(3)	(4)
$Treated_c \times Post_t$	.0932***	.0916***	0559***	0575***
	(2.86)	(3.10)	(-2.70)	(-3.00)
Prop Controls	✓	√	$\checkmark$	$\checkmark$
$Border\timesMonthFE$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Geog FE	n	n	n	n
# of Observations	335,928	335,928	48,211	48,211

1st Stage Dep. var.:	$Treated_c  imes Post_t$				
IV:	$Fcl_{c,t\in(-12;0)}$	$NonFcl_{c,t\in(-12;0)}$	$Fcl_{c,t\in(-12;0)}$	$NonFcl_{c,t\in(-12;0)}$	
	(1)	(2)	(3)	(4)	
$\overline{\ln(\text{Filings})_{c,t\in(0;-12)}}$	.387***	.399***	.519***	.498***	
$\times Post_t$	(4.37)	(5.61)	(4.57)	(5.81)	
Kleibergen-Paap rk	19.07	31.49	20.84	33.70	
Wald F stat					

Introduction 00000	Empirical Strategy and Data	Results ○○○○○○●○○○	Conclusion 00
Channels			
DDD			

Dep. var.:		AuctS	Succ <sub>i,c,t</sub>	
DDD Channel:	Remote <sub>c</sub>	c-iDist;	NoAuct <sub>c,t</sub>	Quality;
	(1)	(2)	(3)	(4)
$\overline{\text{Treated}_c \times Post_t \times Ch}$	.461**	.517*	.118**	.0260**
	(2.24)	(1.80)	(2.48)	(2.40)
$Treated_c  imes Post_t$	381**	.0426**	0257	.0422**
	(-2.08)	(1.77)	(-1.57)	(2.38)
CrossInteractions	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Prop Controls	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Border×Mnth FE	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Geog FE	n	n	n	n
# of Observations	350,056	306,907	350,056	350,056
$R^2$	.093	.093	.093	.093
adj. <i>R</i> <sup>2</sup>	.077	.076	.077	.077

Introduction	Empirical Strategy and Data	Results	Conclusion
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Buyers			

# Auction Buyers

Dep. var.:	OutState <sub>i,c,i</sub>	t b-iDist <sub>i,c,t</sub>	b-cDist <sub>i,c,t</sub>	Profssnal <sub>i,c,t</sub>	MultiProp <sub>i,c</sub>	t Flip <sub>i,c,t</sub>
	(1)	(2)	(3)	(4)	(5)	(6)
$Treated_c \times \mathit{Post}_t$	0547**	0613*	0696**	0495***	0327**	0251**
	(-2.00)	(-1.81)	(-1.86)	(-4.22)	(-1.72)	(-2.47)
HouseAge <sub><i>i</i>,<i>c</i>,<i>t</i></sub>	00109***	00088***	·0010***	.000079	00010	.00051**
	(-5.29)	(-3.54)	(-3.75)	(.38)	(40)	(2.22)
$ln(Size)_{i,c,t}$	.00142	.0146	.0108	0316***	0687***	0105
	(.23)	(1.47)	(1.01)	(-4.18)	(-8.76)	(-1.19)
NoResUnts <sub>i,c,t</sub>	.0724***	0204	0118	00431	.0211	0200
	(3.74)	(85)	(52)	(21)	(1.00)	(90)
$StrucQual_{i,c,t}$	.0118*	003	0052	0107***	0152***	.0067**
	(1.86)	(47)	(75)	(-3.84)	(-3.50)	(2.46)
$Border{\times}Mnth\ FE$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Geog FE	n	n	n	n	n	n
# of Observations	s 25,167	64,022	59,815	62,615	62,615	62,615
$R^2$	.211	.187	.191	.238	.258	.147
adj. <i>R</i> <sup>2</sup>	.082	.121	.125	.178	.199	.080

Introduction 00000	Empirical Strategy and Data	Results ○○○○○○○○●○	Conclusion
REO			

Dep. var.:	REODisc <sub>i,c,t</sub>	OoS <sub>i,c,t</sub>	$Profssnal_{i,c,t}$	T2Sell <sub>i,c,t</sub>	T2Sell <sub>i,c,t</sub>	
	(1)	(2)	(3)	(4)	(5)	
$Treated_c \times Post_t$	.0127	0124	.0230**	.0660***	.045***	
	(1.66)	(62)	(1.96)	(4.95)	(2.52)	
$HouseAge_{i,c,t}$	.00346***	000497***	.000124	00296	.00266	
	(17.82)	(-2.52)	(.76)	(-17.53)	(12.01)	
$ln(Size)_{i,c,t}$	0189**	.0227***	0138**	228***	.133***	
	(-1.98)	(3.58)	(-2.19)	(-27.40)	(12.91)	
NoResUnts <sub>i,c,t</sub>	.0245**	0405**	.0087	0.0415	0292	
	(2.00)	(-2.35)	(.55)	(-1.20)	(85)	
$StrucQual_{i,c,t}$	.0142***	0069	-0.0064	.00703*	.0211	
	(3.92)	(-1.38)	(-1.65)	(1.77)	(3.45)	
$Border{ imes}Mnth\;FE$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
Geog FE	n	n	n	Х	z	
# of Observations	96,894	55,237	119,073	133,667	113,954	
$R^2$	.345	.177	.151	Х	Х	
adj. <i>R</i> <sup>2</sup>	.308	.096	.110	Х	Х	

Introduction 00000	ntroduction Empirical Strategy and Data		Conclusion 00	
Robustness				
Robustness				

- Placebo Robustness
- Cross-county Spillovers
- Excluding border groups with too-early treated;
- Excluding not-yet-treated counties from control;
- Weighted regression;
- Supply effects;
- Ex-ante credit enhanced CreditSupply;

Introduction 00000	Introduction      Empirical Strategy and Data        00000      0000		Conclusion ●0	
Welfare				

- Technology improved auction stage (5%) of foreclosure process  $\rightarrow$  fewer REOs.
  - **Opp.Cost (Empty home): 5%** ×**\$**947 ×4, 583 = **\$**217, 000
  - Effort in vain (Broker Fees): 5% ×5.5% ×\$196,000 × 4,583 = \$2.5M
  - Opp.Cost (Bank Capital): 5% ×4% ×\$196,000 × 4,853 × (1 + 8%/12months) = \$1.8M.
- Total =  $(\$217,000 + \$2.5M + \$1.8M) \times 7.5months = \$33.9M.$
- Note: Lower bound as participation costs (time, effort, fuel) of participants in the auction are likely lower;

Introduction	Empirical Strategy and Data	Results	Conclusion
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Conclusion			

- I study the effect of relaxing demand frictions on foreclosure auctions;
- Exploit shock to bidding process in FL;
- Auction success increases by 27% and auction discount declines by 42%;
  - IV exercise, using court backlog, confirms the results;
  - Driven by accessibility of the courthouse and by the entrance of local buyers;
- Reallocation of (risky distressed) assets from the bank sector to the household sector;
- Substantial welfare gains;

# Appendix - Summary Statistics

	Panel A: Full sample					
	Source	Mean	Std.Dev.	P5	P95	Observ.
AuctSucci.c.t	RPR	.1808	.3848	0	1	593,327
AuctDisc; c t	RPR	.0789	.2045	2610	.4261	60,322
HouseAge;, $c, t$	RPR	26.713	19.730	4	61	435,703
In(Size)	RPR	7.507	.4112	6.880	8.202	424,607
NoResUnts <sub>i.c.t</sub>	RPR	1.022	6.042	1	1	417,721
StrucQual	RPR	3.104	.8184	2	4	407,897
$\ln(Fcl)_{c,t \in (-12:0)}$	FLCourts	6.409	1.369	3.543	8.246	566,722
$\ln(\text{NonFcl})_{c,t\in(-12)}$	0) FLCourts	5.584	1.210	3.554	7.385	566,722
AQoS	RPR	.1049	.3064	0	1	34,295
AProtss	RPR	.16//	.3736	0	1	106,270
AFIIP AMultiProp	RPR	3202	.3027	Ň	i	107,250
NoAuct <sub>c</sub> t	RPR	.4937	.3499	ŏ	î	593.327
Remoteness <sub>c</sub> +	FLCourts	.9357	.0905	.8437	.9925	593,327
b-iDist; c t	RPR	.4064	.6144	0	2.094	64,470
c-iDist <sub>i.c.t</sub>	RPR	.0293	.0539	0	.1310	317,994
c-bDist <sub>i,c,t</sub>	RPR	.4210	.6043	.0046	2.071	75,010
	Panel B:	Change Pre-ever	s in foreclo	sure out	comes a Post	and characteristics
	Treated	Control	T-C	Treated	Control	T-C
AuctSucci.c.t	.1427	.1912	0485 <sup>***</sup>	.1968	.1906	.0062 <sup>***</sup>
AuctDisci, c, t	.1401	.0749	.0652***	.0672	.0583	.0089*
HouseAge;, $c, t$	28.722	23.538	5.183***	30.462	25.353	5.109***
In(Size)	7.473	7.463	.009***	7.480	7.458	.022***
NoResUnts <sub>i.c.t</sub>	1.010	1.008	.002**	1.010	1.008	.002***
StrucQual <sub>i,c,t</sub>	3.124	3.074	.050***	3.124	3.119	.005
Go back						
zzola (RSM)		e-for	eclosures			August, 2022

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# Robustness tests

Dep.Var.: AuctSucc <sub>i.c.t</sub>	(1)	(2)	(3)	(4)	(5)	(6)	
	Placebo	Donut	LateTr	NotYetTr	wReg	Supply	
$Treated_c \times Post_t$	.00121	.0346**	.0538***	.0624***	.0458***	.0504***	
	(.05)	(2.26)	(3.02)	(3.45)	(3.12)	(2.67)	
$Tr_{c}  imes P_{t}  imes \mathit{GovAg}_{i,c,t}$						.0754	
						(1.39)	
Prop Controls	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
$Border{ imes}Mnth\;FE$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	
Geog FE	n	n	n	n	n	n	
# of Observations	171,413	210,067	251,018	300,983	251,109	344,166	
$R^2$	.088	.089	.093	.094	.087	.095	
adj. R <sup>2</sup>	.072	.069	.081	.078	.075	.080	
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# Ex-ante Credit

Model:	C	OLS		IV		Duration	
Dep. var.:	Acce	Accept <sub>i,c,t</sub>		Accept <sub>i,c,t</sub>		Modi	fy <sub>i,c,t</sub>
	(1)	(2)	(3)	(4)		(5)	(6)
$Tr_c  imes Pt_t$	.00678**'	* .00564***	.0189***	.0221***	$\operatorname{Tr}_{c} \times Pt_{t}$	406	.914
	(9.95)	(3.79)	(3.36)	(4.73)		(-1.08)	(12)
$LoanAmt_{i,c,t}$		0282**	0262***	0262***	LAge <sub>i,c,t</sub>	0039	.996
		(-2.26)	(-4.13)	(-4.13)		(46)	(70)
Minority <sub>i,c,t</sub>		0798***	0760***	0760***	$LTV_{i,c,t}$	.0094	1.012
		(-10.31)	(-17.18)	(-17.18)		(.47)	(.75)
$DTI_{i,c,t}$		00152***	*0014***	00144***	DTI <sub>i,c,t</sub>	.002***	1.002***
		(-2.85)	(-3.49)	(-3.49)		(2.67)	(2.82)
$Female_{i,c,t}$		0170***	017***	0170***	FICO <sub>i,c,t</sub>	0025	.998
		(-5.99)	(-15.08)	(-15.08)		(-1.02)	(60)
$Border{ imes}Mnth$	FE √	$\checkmark$	$\checkmark$	$\checkmark$		$\checkmark$	$\checkmark$
Geog FE	n	n	n	n		z	z
# of Obs.	2,726,797	2,442,002	2,226,925	2,226,925		13,880	13,880
$R^2$	.049	.060	.009	.009			
adj. R <sup>2</sup>	.046	.058	.009	.009			
Go back							